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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,292	12/19/2001	Craig A. Cavins	SC11482TP	2730

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MOTOROLA INC  
AUSTIN INTELLECTUAL PROPERTY  
LAW SECTION  
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AUSTIN, TX 78729

EXAMINER

ECKERT II, GEORGE C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 03/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
10/025,292

Applicant(s)  
Cavins et al.

Examiner  
George C. Eckert II

Art Unit  
2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Dec 19, 2001
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Dec 19, 2001 is/are a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 6) ☐ Other:

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## DETAILED ACTION

### *Claim Objections*

1. Claim 1 is objected to because of the following informalities: on lines 27 and 31, delete "is" and insert --are-- in its place. Appropriate correction is required.

### *Claim Rejections - 35 U.S.C. § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1, 2, 8-11, 13-19 and 23 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by US 6,438,030 to Hu et al. The disclosure of Hu et al. teaches all the limitations of claims 1, 2, 8-11, 13-19 and 23. It is noted that the instant specification at page 8, line 22 to page 23, line 10 matches the disclosure of Hu et al. at column 3, line 64 to column 11, line 13.

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Moreover, the instant figures 1-11 match figures 1-11 of Hu et al. In these identical disclosures are taught, in each occurrence, the limitations of claims 1, 2, 8-11, 13-19 and 23.

3. Claims 11-15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,143,607 to Chi. Chi teaches, with reference to figures 3, 7 and 11-13, a semiconductor device having a non-volatile memory (NVM) array including rows and columns of memory cells comprising:

- a well region 1101 formed within a semiconductor substrate 1103;

- a column of memory cells (fig. 7) wherein each memory cell comprises:

- a source region 1107 and a drain region 1105 positioned within the well region, wherein each source region is electrically coupled to the well region (note that the source 1107 and well 1101 are the same conductivity);

- a tunnel dielectric layer 1201 formed over the substrate;

- a charge storing layer 1203 formed over the tunnel dielectric;

- a control gate 1303 formed over the charge storage layer;

- wordlines (fig. 7), wherein each wordline is electrically coupled to a respective control gate of a memory cell in the column of memory cells; and

- a bitline (fig. 7) electrically coupled to drain regions of each memory cell in column of memory cells.

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With regard to claim 12, Chi teaches that the devices comprises a blocking layer 1301 of ONO over the charge storage layer (col. 8, lines 1-4). With regard to claim 13, Chi teaches that the charge storage layer comprises polysilicon which is a semiconductor material (col. 7, lines 56-58). With regard to claim 14, Chi teaches that the charge storage layer comprises discrete storage elements (fig. 13). With regard to claim 15, Chi teaches that the device is devoid of conductive source lines that electrically couple to each source region (col. 6, lines 47-49). With regard to claim 17, Chi teaches that the well region is P-type (fig. 11).

4. Claims 18 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,679,591 to Lin et al. Lin et al. teach, with reference to figure 15A, a semiconductor device comprising:

a semiconductor substrate 12 comprising a first well region 14a and a second well region 14b, wherein the first well region and the second well region are isolated from each other;

a first memory cell formed in the first well region, the first memory cell comprising:

a first source 36a and a first drain 36b within the first well region having a polarity different than that of the first well region 14a;

a first tunnel dielectric layer 21 (fig. 14) formed over the source and drain region;

a first charge storage layer 22a formed over the first tunnel dielectric layer; and

a first control gate formed over the first charge storage layer 28A; and

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a second memory cell formed in the second well region, wherein the second well memory cell comprises the same layout of the first memory cell including source 36a' and wherein the first and second memory cells are electrically coupled via wordline 28A (WL1).

With regard to claim 19, Lin et al. teach that the first and second well regions 14a and b are both P-type.

***Claim Rejections - 35 U.S.C. § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. in view of US 6,005,270 to Noguchi. Lin et al. taught the device of claim 18 as discussed above. However, Lin et al. did not teach that the first charge storage layer was non-conductive and was covered by a blocking layer or that the second charge storage layer comprised nanocrystals.

Noguchi teaches in figure 1 a non-volatile memory device comprising a tunnel insulator 22a, conductive floating gate 32a, and a control gate 33a. Noguchi further teaches that a non-volatile memory device may be formed using either an ONO layer, wherein the nitride layer serves as the non-conductive charge storage layer, or a nanocrystal layer serving as the charge storage

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layer. See Noguchi, col. 14, line 37 - col. 15, line 30, and col. 15, line 51 - col. 16, line 15.

Noguchi provides motivation to form the non-volatile memory device having an ONO (MONOS) structure or a nanocrystal structure in that they are preferred alternatives to a conductive floating gate layer. Noguchi, col. 5, lines 37-51. Lin et al. and Noguchi are combinable as they are from the same field of endeavor which is non-volatile memory devices. As such, it is considered obvious to combine Lin et al. and Noguchi to achieve the device of instant claims 20-22.

### ***Double Patenting***

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 3-7, 12 and 20-22 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 6,438,030 in view of US 6,005,270 to Noguchi. Claims 1-8 of the '030 patent teach limitations of instant claims 1, 11 and 18 but do not teach that the non-volatile memory device is formed devoid of floating gates, that the charge storage layers are non-conductive or comprise nitrogen, that a blocking layer is formed over the charge storage layer and under the control gate, or that the charge storage material comprises nanocrystals. However, these limitations are well known in the art as taught by '270 to Noguchi.

Specifically, Noguchi teaches a non-volatile memory device similar to that in the '030 patent. For example, Noguchi teaches in figure 1 a non-volatile memory device comprising a tunnel insulator 22a, conductive floating gate 32a, and a control gate 33a. Noguchi further teaches that a non-volatile memory device may be formed using either an ONO layer, wherein the nitride layer serves as the non-conductive charge storage layer, or a nanocrystal layer serving as the charge storage layer. See Noguchi, col. 14, line 37 - col. 15, line 30, and col. 15, line 51 - col. 16, line 15. Noguchi provides motivation to form the non-volatile memory device having an ONO (MONOS) structure or a nanocrystal structure in that they are preferred alternatives to a



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conductive floating gate layer. Noguchi, col. 5, lines 37-51. As such, it is considered obvious to combine the claims of the '030 patent and Noguchi to achieve instant claims 3-7, 12 and 20-22.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (703) 305-2752.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Eddie Lee can be reached on (703) 308-1690. The fax number is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

GCE  
March 24, 2003

  
**GEORGE ECKERT**  
**PRIMARY EXAMINER**